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TITLE: HEATING BODY, HEATING DEVICE, AND IMAGE FORMING DEVICE

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ABSTRACT:

PROBLEM TO BE SOLVED: To achieve improvement in the heat efficiency of a film heat type heating device and facilitation of management of parts.

SOLUTION: A heating body 1 is fixedly supported to form a nip N together with a pressure member 6 via a slide film 4 and to heat an image on a recording material P being held and carried between the film 4 and a pressure member 6 in the nip N via the film 4. The heating body 1 has a base and a heating element which is provided on the base. The base has a projection (b) which projects toward the film sliding side in the area of the nip N and extends perpendicular to the direction in which the film is moved.

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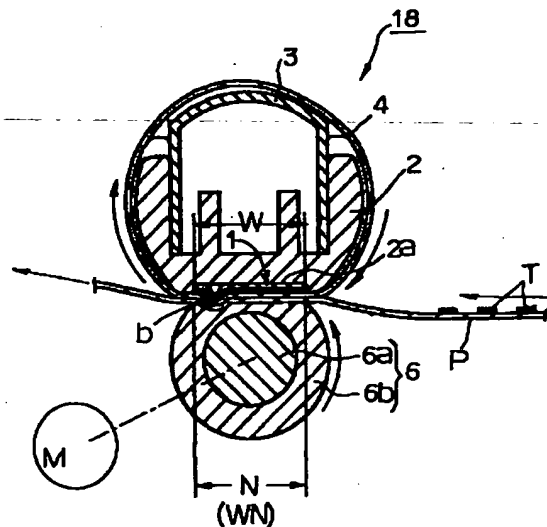
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(54)【発明の名称】 加熱体、加熱装置、及び画像形成装置

(57)【要約】

【課題】フィルム加熱方式の加熱装置の加熱効率の向上、部品管理の容易化等。

【解決手段】固定支持され、摺動フィルム4を介して加圧部材6とニップNを形成し、ニップNのフィルム4と加圧部材6との間で挟持搬送される記録材Pの画像をフィルム4を介して加熱する加熱体1であり、基材と、この基材に設けられた発熱体を有し、基材は、ニップNの領域内においてフィルム摺動面側に突出していて、フィルム移動方向と交差する方向に延びている凸部bを有すること。



## 【特許請求の範囲】

【請求項1】固定支持され、摺動フィルムを介して加圧部材とニップを形成し、前記ニップのフィルムと加圧部材との間で挟持搬送される記録材の画像を前記フィルムを介して加熱する加熱体であり、

基材と、この基材に設けられた発熱体を有し、前記基材は、前記ニップの領域内においてフィルム摺動面側に突出して、フィルム移動方向と交差する方向に延びている凸部を有することを特徴とする加熱体。

【請求項2】請求項1に記載の加熱体であって、前記凸部が前記基材の発熱体領域外で、かつ記録材通紙方向下流側に配置されていることを特徴とする加熱体。

【請求項3】請求項1または2に記載の加熱体であって、前記基材の材質が金属であり、該基材に前記発熱体が絶縁層を介して形成されていることを特徴とする加熱体。

【請求項4】請求項1から3の何れかの項に記載の加熱体であって、前記基材として金属板を用い、前記凸部が該金属板の絞り加工または曲げ加工にて形成されていることを特徴とする加熱体。

【請求項5】請求項1または2に記載の加熱体であって、前記基材の材質が絶縁部材であり、該基材に前記発熱体が形成されていることを特徴とする加熱体。

【請求項6】請求項1から5の何れかの項に記載の加熱体であって、前記発熱体が印刷により形成されていることを特徴とする加熱体。

【請求項7】固定支持された加熱体と、前記加熱体と摺動するフィルムと、前記フィルムを介して前記加熱体とニップを形成する加圧部材と、を有し、前記ニップのフィルムと加圧部材との間で画像を担持した記録材を挟持搬送させ、前記フィルムを介した前記加熱体からの熱により記録材上の画像を加熱する加熱装置において、前記加熱体は、基材と、この基材に設けられた発熱体を有し、前記基材は、前記ニップの領域内においてフィルム摺動面側に突出し、フィルム移動方向と交差する方向に延びている凸部を有することを特徴とする加熱装置。

【請求項8】請求項7に記載の加熱装置であって、前記加熱体基材の凸部が前記基材の発熱体領域外で、かつ記録材通紙方向下流側に配置されていることを特徴とする加熱装置。

【請求項9】請求項7または8に記載の加熱装置であって、前記加熱体基材の材質が金属であり、該基材に前記発熱体が絶縁層を介して形成されていることを特徴とする加熱装置。

【請求項10】請求項7から9の何れかの項に記載の加熱装置であって、前記加熱体基材として金属板を用い、前記凸部が該金属板の絞り加工または曲げ加工にて形成されていることを特徴とする加熱装置。

【請求項11】請求項7または8に記載の加熱装置であって、前記加熱体基材の材質が絶縁部材であり、該基材

に前記発熱体が形成されていることを特徴とする加熱装置。

【請求項12】請求項7から11の何れかの項に記載の加熱装置であって、前記加熱体の前記発熱体が印刷により形成されていることを特徴とする加熱装置。

【請求項13】請求項7から12の何れかの項に記載の加熱装置であって、前記加圧部材が回転体であることを特徴とする加熱装置。

【請求項14】記録材に画像を形成担持させる作像手段と、画像を担持した記録材を加熱する像加熱手段を有する画像形成装置であり、前記像加熱手段が請求項7から13の何れかの項に記載の加熱装置であることを特徴とする画像形成装置。

## 【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】本発明は、フィルム加熱方式の加熱装置、該加熱装置に用いられる加熱体、該加熱装置を像加熱手段として具備した、直接方式もしくは転写方式の電子写真方式・静電記録方式・磁気記録方式等の画像形成装置（複写機・プリンタ・ファックスなど）に関する。

## 【0002】

【従来の技術】フィルム加熱方式の加熱装置は特開昭63-313182号公報・特開平2-157872号公報などに記載されているように、固定支持された加熱体と、加熱体と摺動するフィルムと、フィルムを介して加熱体とニップを形成する加圧部材と、を有し、ニップのフィルムと加圧部材との間で、画像を担持した記録材（エレクトロファックスシート、静電記録シート、転写材シート、印刷紙など）を挟持搬送させ、フィルムを介した加熱体からの熱により記録材上の画像を加熱する構成のものである。

【0003】加熱体としてセラミックヒータ等の低熱容量で昇温の速いものを用いることができ、フィルムとして熱容量の小さい薄膜のものを用いることができ、加熱部であるニップのみを加熱することで、クイックスタート性（オンデマンド性）がよく、省エネルギーの像加熱を実現することができる。

【0004】この加熱装置は、未定着顕像剤（加熱溶融性の樹脂等より成るトナー像）を記録材に永久固着像として加熱定着させる定着装置として活用できる他、画像を担持した記録材を加熱してつや等の表面性を改質する像加熱装置、仮定着処理する像加熱装置などとしても活用できる。

## 【0005】

【発明が解決しようとする課題】上記のようなフィルム方式の加熱装置において、加熱体としてのセラミックヒータは、ヒータ基材としてのアルミナ等のセラミック基板と、このセラミック基板面に例えばスクリーン印刷法等でパターン形成して具備させた銀-パラジウム（Ag

／Pd)等の通電発熱体を基本構成部材とするものである。ヒータ基材としてのセラミック基板を薄板化することで、熱容量の削減、立ち上げ時間の短縮化、および消費電力の削減に効果がある。

【0006】またヒータ基材をセラミックから、金属に置き換える試みが成されつつある。製造コスト削減を目的として試みられているものである。この金属基板ヒータの場合は通電発熱体はこの基板に対して絶縁層を介してスクリーン印刷法等でパターン形成して設けられる。セラミックに比べ、加工上の取り扱いが有利であるほか、ヒータ基材としての金属基板を従来のセラミックヒータの厚みに比べ、同等以下の板厚に薄板化することで、熱容量の削減、立ち上げ時間の短縮化、および消費電力の削減に効果がある。

【0007】しかしながら、セラミック基板のヒータの場合も、金属基板のヒータの場合も、基板の板厚を薄くして熱容量を小さくしていった場合、基板あるいは加熱体単品としての強度が減少し、折れ・曲げに対するマージンも減少方向となり、その結果通電発熱体パターンの断線に対するマージンも減少することから、部品管理上の取扱いが難しくなる問題を有していた。

【0008】そこで本発明の目的は、フィルム加熱方式の加熱装置に用いられる加熱体として、ヒータ基板(加熱体基材)の板厚を薄くして熱容量を小さくした場合でも、強度低下させず、折れ・曲げに対して強く、折れ・曲げで通電発熱体パターンを断線させる恐れがなく、物流・部品管理上取扱いやすいものとした加熱体を提供することである。

【0009】また、上記の加熱体を備えて、耐久性に優れ、また加熱効率(定着効率)の高い加熱装置を提供することである。

【0010】さらに、上記の加熱装置を像加熱手段として具備した画像形成装置を提供することである。

【0011】

【課題を解決するための手段】本発明は下記の構成を特徴とする、加熱体、加熱装置、及び画像形成装置である。

【0012】(1)固定支持され、摺動フィルムを介して加圧部材とニップを形成し、前記ニップのフィルムと加圧部材との間で挟持搬送される記録材の画像を前記フィルムを介して加熱する加熱体であり、基材と、この基材に設けられた発熱体を有し、前記基材は、前記ニップの領域内においてフィルム摺動面側に突出して、フィルム移動方向と交差する方向に延びている凸部を有することを特徴とする加熱体。

【0013】(2)前記(1)に記載の加熱体であって、前記凸部が前記基材の発熱体領域外で、かつ記録材通紙方向下流側に配置されていることを特徴とする加熱体。

【0014】(3)前記(1)または(2)に記載の加

熱体であって、前記基材の材質が金属であり、該基材に前記発熱体が絶縁層を介して形成されていることを特徴とする加熱体。

【0015】(4)前記(1)から(3)の何れかに記載の加熱体であって、前記基材として金属板を用い、前記凸部が該金属板の絞り加工または曲げ加工にて形成されていることを特徴とする加熱体。

【0016】(5)前記(1)または(2)に記載の加熱体であって、前記基材の材質が絶縁部材であり、該基材に前記発熱体が形成されていることを特徴とする加熱体。

【0017】(6)前記(1)から(5)の何れかに記載の加熱体であって、前記発熱体が印刷により形成されていることを特徴とする加熱体。

【0018】(7)固定支持された加熱体と、前記加熱体と摺動するフィルムと、前記フィルムを介して前記加熱体とニップを形成する加圧部材と、を有し、前記ニップのフィルムと加圧部材との間で画像を担持した記録材を挟持搬送させ、前記フィルムを介した前記加熱体からの熱により記録材上の画像を加熱する加熱装置において、前記加熱体は、基材と、この基材に設けられた発熱体を有し、前記基材は、前記ニップの領域内においてフィルム摺動面側に突出し、フィルム移動方向と交差する方向に延びている凸部を有することを特徴とする加熱装置。

【0019】(8)前記(7)に記載の加熱装置であって、前記加熱体基材の凸部が前記基材の発熱体領域外で、かつ記録材通紙方向下流側に配置されていることを特徴とする加熱装置。

【0020】(9)前記(7)または(8)に記載の加熱装置であって、前記加熱体基材の材質が金属であり、該基材に前記発熱体が絶縁層を介して形成されていることを特徴とする加熱装置。

【0021】(10)前記(7)から(9)の何れかに記載の加熱装置であって、前記加熱体基材として金属板を用い、前記凸部が該金属板の絞り加工または曲げ加工にて形成されていることを特徴とする加熱装置。

【0022】(11)前記(7)または(8)に記載の加熱装置であって、前記加熱体基材の材質が絶縁部材であり、該基材に前記発熱体が形成されていることを特徴とする加熱装置。

【0023】(12)前記(7)から(11)の何れかに記載の加熱装置であって、前記加熱体の前記発熱体が印刷により形成されていることを特徴とする加熱装置。

【0024】(13)前記(7)から(12)の何れかに記載の加熱装置であって、前記加圧部材が回転体であることを特徴とする加熱装置。

【0025】(14)記録材に画像を形成担持させる作像手段と、画像を担持した記録材を加熱する像加熱手段を有する画像形成装置であり、前記像加熱手段が(7)

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から(13)の何れかに記載の加熱装置であることを特徴とする画像形成装置。

#### 【0026】(作 用)

①. 加熱体は、その基材の一部にフィルム移動方向と交差する方向に稜線が延びている凸部を有することにより、その凸部が補強リブの作用をなし、熱容量の低減のために基材の板厚を薄くしていった場合でも、剛性が保たれて強度低下させず、折れ・曲げに対して強く、折れ・曲げで通電発熱体パターンを断線させる恐れがなく、物流・部品管理上取扱いやすいものとなる。

【0027】②. また、その凸部はニップの領域内においてフィルム摺動面側に突出させて設けていることで、加熱体裏面側(ニップ側とは反対側)に余分な熱を逃がすことなく、かつニップにおける加熱により溶融軟化した画像(トナー)を溶融状態のままで上記凸部で記録材に強く圧接する(瞬間的な高圧を記録材上で溶融しているトナーにかける)ことになるので定着効率が向上する。

#### 【0028】

【発明の実施の形態】(第1の実施例)図1は本実施例の加熱装置の要部の横断側面模型図、図2は同装置の要部の縦断正面模型図、図3は同装置の要部の一部切欠き斜視模型図、図4はその分解斜視模型図である。

【0029】本実施例の加熱装置18は、特開平4-44075~44083号公報、同4-204980~204984号公報等に開示の、円筒状フィルム(エンドレスフィルム)を用いたテンションレスタイプのフィルム加熱方式の定着装置である。

【0030】1は細長い、薄板状の低熱容量の加熱体(加熱手段)である。この加熱体の構造は後述する。2は断熱材にて形成された、横断外形略半円弧状の極型のフィルムガイド部材である。上記の加熱体1はこのフィルムガイド部材2の下面の略中央部に部材長手に沿って具備させた加熱体収容凹部2aに嵌め入れて取り付けられている。3は横断面向下向きU字型の補強ステーであり、上記のフィルムガイド部材2の内側に嵌め入れてある。4は円筒状の耐熱性フィルム(定着フィルム)である。このフィルム4の内周長は上記の加熱体1・フィルムガイド部材2・補強ステー3の組み立て体の外周長よりも例えば3mm程長くしてあり、このフィルム4を上記の組み立て体1・2・3に対してルーズに外嵌させてある。5・5は補強ステー3の両端部にそれぞれ装着したフィルム端部ガイド(フランジ部材)である。以上の組み立て体1~5を加熱アセンブリ(加熱手段)とする。

【0031】6は加圧回転体としての弾性加圧ローラである。芯金6aと、該芯金に同心一体に設けたシリコンゴム等の離型性のよいゴム弾性層6bからなり、芯金6aの両端部をそれぞれ装置の不図示の手前側と奥側のシャーシ側板間に軸受を介して回転自由に支持させてある。

【0032】この加圧ローラ6の上側に上記の加熱アセンブリ1~5を加熱体1側を下向きにし、両端側のフィルム端部ガイド5・5の外方突出部をそれぞれ装置の不図示の手前側と奥側のシャーシ側板の縦方向ガイドスリット部に係合させて手前側と奥側のシャーシ側板間に落とし込み、加圧ローラ6の上面にフィルム4を挟ませて加熱体1の下向き面を対向位置させる。

【0033】そして、両端側の各フィルム端部ガイド5・5の外方突出部とそれよりも上部位置の不動のバネ受け部7・7との間にそれぞれ加圧バネ8・8を締結することで、加熱体1をフィルム4を挟ませて加圧ローラ6に対してゴム弾性層6bの弾性に抗して総圧約39~196N(4~20kgf)で圧接させてある。これにより加熱体1と加圧ローラ6との間にフィルム4を挟んで所定幅のニップ(定着ニップ部)Nが形成される。そのニップNは加圧ローラ6あるいは加熱体1の長手方向全域にわたり略均一な幅となっている。即ち、補強ステー3をその両端部のフィルム端部ガイド5・5を介して真上から加圧し、ニップ全域でたわみが生じないように考慮したものである。ニップ線は提えず理想的な提み無しの直線N1(図2)となる。このとき、ニップ幅WNは均等となり、トナー定着性が紙幅方向で均一に保証されている。

【0034】フィルム4は、熱容量を小さくしてクイックスタート性を向上させるために、フィルムの膜厚は総厚100μm以下、好ましくは50μm以下30μm以上の耐熱性・離型性・強度・耐久性等のあるPTFE、PFA等の単層フィルム、あるいはポリイミド、ポリアミドイミド、PEEK、PES、PPS等のフィルムの表面にPTFE、PFA、FEP等を離型層としてコーティングした複合層フィルム、または、金属箔を用いたシーム有り、あるいはシームレスの金属管を含むものである。

【0035】加圧ローラ6は駆動手段Mにより図1において矢印の反時計方向に所定の周速度で回転駆動される。この加圧ローラ6の回転による該ローラの外面とフィルム4の外面との、ニップNにおける圧接摩擦力で円筒状のフィルム4に回転力が作用して、該フィルム4がその内面がニップNにおいて加熱体1の下向き面に密着して摺動しながら矢印の時計方向に加圧ローラ6の回転周速度に略対応した周速度をもってフィルムガイド部材2と補強ステー3の外回りを回転状態になる(加圧ローラ駆動方式)。

【0036】フィルムガイド部材2の外面とフィルム4の内面との間にグリス等の潤滑材を介在させることで上記のフィルム4の回転をより滑らかなものに行うことができる。フィルム4の回転に伴うフィルムガイド部材2の長手に沿う寄り移動はフィルム4の端部がガイド5の内面に受け止められることで規制される。

【0037】加圧ローラ6が回転駆動され、それに伴っ

て円筒状フィルム4が回転状態になり、後述するように加熱体1に通電がなされて該加熱体1の発熱でニップNが所定の温度に立ち上がって温調された状態において、ニップNのフィルム4と加圧ローラ6との間に未定着トナー画像Tを担持した記録紙Pが導入され、ニップNにおいて記録紙Pのトナー画像担持面側がフィルム4の外面に密着してフィルム4と一緒にニップNを挟持搬送されていく。この挟持搬送過程において、加熱体1の熱がフィルム4を介して記録紙Pに付与され、記録紙上の未定着トナー画像Tが加熱溶融定着される。記録紙PはニップNを通過すると回転するフィルム4の外表面から曲率分離して搬送される。

【0038】以下に加熱体1の構造を説明する。本実施例における加熱体1は加熱体基材に金属板を用いたタイプのものである。用いる金属材料は例えばステンレススチールに代表される鉄系金属、アルミニウム、銅合金等である。

【0039】図5の(a)は加熱体の表面側の一部切欠き平面模型図、(b)は加熱体の裏面側の平面模型図、(c)は(b)図のc-c線に沿う拡大横断面模型図である。

【0040】aはフィルム移動方向(記録紙通紙方向)と略直交する方向を長手とする金属板基材である。Wはこの金属板基材aの幅であり、前記のニップ幅WNに対し、 $WN \approx W$ の関係にある。bはこの金属板基材aの長手に沿って具備させた凸部としての、金属板絞り加工によるビード(玉縁)である。このビードbは加熱体1の表面側、即ちフィルム摺動面側(記録紙側)に突出させて具備させてある。突出量は例えば1mm以下である。

【0041】cは金属板基材bの表面側を被覆させた絶縁層、dはこの絶縁層c上に基材長手に沿って具備させた線状あるいは細帯状の、発熱源としての通電発熱体(抵抗発熱体)である。

【0042】eは同じく絶縁層c上に基材長手に沿って通電発熱体dに並行に具備させた線状あるいは細帯状の給電路である。

【0043】fとgは基材長手の一端部側において絶縁層c上に並設した第1と第2の給電電極であり、第1の給電電極fは上記通電発熱体dの一端部と電気的に導通させてある。第2の給電電極gは上記給電路eの一端部と電気的に導通させてある。また通電発熱体dと給電路eの他端部は互いに電気的に導通させてある。

【0044】hは第1と第2の給電電極f・gの部分を除いて加熱体表面を全面的に被覆させた表面保護層としてのガラス等の電気絶縁性オーバーコート層である。

【0045】iは加熱体1の裏面(背面)側に接触させて設けたサーミスタ等の温度検出素子、jは同じく加熱体1の裏面側に接触させて設けた安全対策用温度検出素子(サーマルプロテクタ、装置の故障等による暴走昇温対策)としての温度ヒューズやサーモスイッチである。

【0046】通電発熱体dは、例えば、銀-パラジウム(Ag/Pd)、 $Ta_2N$ 等の電気抵抗材料ペースト(抵抗ペースト)を例えば厚さ10 $\mu m$ 、幅1~3mmの細帯状パターンにスクリーン印刷等により塗工し焼成することで形成される。

【0047】給電路eと第1と第2の給電電極f・gも、例えば、銀(Ag)ペーストを所要パターンにスクリーン印刷等により塗工し焼成することで形成される。

【0048】加熱体1のオーバーコート層h側がフィルムが摺動する表面側である。加熱体1はこの表面側を外部に露呈させ、フィルムガイド部材2の下面の略中央部に部材長手に沿って具備させた加熱体收容凹部2aに嵌め入れて取り付けられている。

【0049】9は加熱体1の通電発熱体dに対する給電用コネクタであり、加熱体1を取り付けたフィルムガイド部材2の加熱体給電電極側の端部に嵌着される。コネクタ9は加熱体長手に対して平行に差し込む配置としてあるが、第1と第2の給電電極f・gを引き回した上で、長手方向に対して垂直方向の配置としても良い。

【0050】この給電用コネクタ9を介して加熱体1の第1と第2の給電電極f・g間に交流電源10(図4)より電圧が印加され、通電発熱体dが発熱することで加熱体1が昇温する。加熱体1の温度は加熱体基材aの背面の温度検出素子iで検出されてその検出情報が通電制御回路11へフィードバックされて交流電源から通電発熱体dへの通電が制御されることで定着実行時に温度検出素子iで検出される加熱体1の温度が所定の温度(定着温度)になるように温調制御されるものである。

【0051】温度ヒューズあるいはサーモスイッチjは通電発熱体dに対する給電回路に直列に挿入しており、加熱体1の許容外の過昇温時に作動して通電発熱体dに対する給電を緊急遮断する。

【0052】本実施例の加熱体1は、加熱体基材aとして金属を用い、かつ同部品の薄肉化と、凸部としてのビードbを形成し、記録紙通紙面へ突出するように配したことにより、単品状態での通電発熱体dの反り強度保証を行い、長手全域で、折れ・曲げによる通電発熱体dの断線を防ぎつつ、定着効率を改善、消費電力の削減を実現する。すなわち、加熱体基材aとして金属を用い、その板厚を薄くして熱容量を小さくした場合でも、ビードbによる補強が成されていることで強度低下させず、折れ・曲げに対して強く、折れ・曲げで通電発熱体パターンを断線させる恐れがなく、部品管理上取扱いやすいものとなされている。

【0053】加熱体基材aはニップ幅WN内に記録紙通紙方向と交差する方向に延びている凸部としてのビードbを記録紙通紙方向において通電発熱体dより下流側に有しており、フィルム4とエッジ当たりせずに摺動し、溶融したトナーをフィルム4を介して記録紙に圧接している。すなわち、ニップNにおいて通電発熱体dの位置

を通過した記録材Pは溶融したトナーを載せ、ニップN内のビードbに到達し、瞬間的に強く記録紙に圧接され、定着効率が向上する。このとき、フィルム4の内周面とビードbは、エッジ当りしないようにビード先端部に曲面部を設けてあり、またフィルム内周面に潤滑材を塗布することにより、フィルム内周面にダメージを受けることなく擦れ合うことができる。

【0054】加熱体1のオーバーコート層hは図6の例のように通電発熱体dと給電路eの表面部分のみを覆わせて具備させてもよく、同様の効果が得られる。

【0055】加熱体基材である金属基板aに具備させる凸部としてのビードbは、部品量産時にプレス加工工程にて、複数個の基材を同時に加工しやすくでき、溶融状態にあるトナーを記録紙に圧接することができ、また、フィルムとのエッジ当たりをも避けることができる。

【0056】(第2の実施例) 図7は本実施例の加熱体1の横断面拡大模型図である。本実施例の加熱体1は金属板基材aに具備させる凸部bをヘミング曲げ(金属板の曲げ加工)により形成したものである。その他の加熱体構成は上述した第1の実施例における加熱体と同様であるから再度の説明は省略する。

【0057】本例の場合も、加熱体基材aは金属板であり、薄肉化とヘミング曲げによる補強が成されており、単品状態で、折れ・曲げに対し通電発熱体dが断線しにくく、扱いやすくされている。

【0058】ニップNにおいて通電発熱体dの位置を通過した記録材Pは溶融したトナーを載せ、ニップN内の凸部としてのビードbに到達し、瞬間的に強く記録紙に圧接され、定着効率が向上する。このとき、フィルム4の内周面とヘミング曲げ部bは、オーバーコート層hとしてのガラスコート層により微小段差部αを埋めることによりエッジ当りしない。また潤滑材を用いることにより、フィルム内周面にダメージを受けることなく擦れ合うことができる。

【0059】加熱体1のオーバーコート層hは図8の例のように通電発熱体dと給電路eの表面部分のみを覆わせて具備させてもよく、同様の効果が得られる。

【0060】(第3の実施例) 図9は本実施例の加熱体1の横断面拡大模型図である。本実施例の加熱体1は加熱体基材aとしてセラミック等断熱材を用い、ニップN内で溶融したままのトナーを瞬間的に強く記録紙に圧接するために、基材aの長手方向全領域に渡る凸部bを具備させたものである。凸部先端稜線はニップN内に突出している。絶縁層cは不要である。その他の加熱体構成は上述した第1の実施例における加熱体と同様であるから再度の説明は省略する。

【0061】本例の場合も、薄肉化と凸部bによる補強が成されており、単品状態で、折れ・曲げに対し通電発熱体dが断線しにくく、扱いやすくされている。

【0062】ニップNにおいて通電発熱体dの位置を通過した記録材Pは溶融したトナーを載せ、ニップN内の凸部bに到達し、瞬間的に強く記録紙に圧接され、定着効率が向上する。このとき、フィルム4の内周面と凸部bは、同部にエッジ部を持たず、また潤滑材を用いることにより、フィルム内周面にダメージを受けることなく擦れ合うことができる。

【0063】加熱体1のオーバーコート層hは図10の例のように通電発熱体dと給電路eの表面部分のみを覆わせて具備させてもよく、同様の効果が得られる。

【0064】(第4の実施例)

1) 前述の第1の実施例および第2の実施例の加熱体について、図11の(a)や(b)のように、加熱体1の金属板基材aの裏面側に、絶縁層cを介して、通電発熱体d、給電路e、給電電極f・gを具備させた構造(裏面加熱型)のものにすることもできる。

【0065】2) 前述の第3の実施例の加熱体についても、図11の(c)のように、加熱体基材aとして例えば窒化アルミニウム(AlN)・炭化珪素(SiC)のような高熱伝導性のセラミックスを用いて、その裏面側に、通電発熱体d、給電路e、給電電極f・gを具備させた構造のものにすることもできる。

【0066】3) 通電発熱体d、給電路e、給電電極f・g等のパターン構成、加熱装置構成は実施例のものに限られないことは勿論である。

【0067】4) 温調用の温度検知素子iや安全対策用温度検出素子jの配設位置等も実施例のものに限られないことは勿論である。例えば温調用の温度検知素子iは通紙領域外かつ通紙発熱体近傍で、フィルムの外側直近に配置してもよい。フィルムが金属円筒であれば必要な絶縁を行った上、内周面に配置しても良い。

【0068】(第5の実施例) 図12は例えば第1の実施例の加熱装置(定着装置)18を具備させた画像形成装置の一例の概略構成図である。本実施例の画像形成装置は転写方式電子写真プロセスを用いたレーザービームプリンタである。

【0069】11はプリンタ本体に対して着脱自在のプロセスカートリッジであり、感光体ドラム12と、不図示の帯電器、現像器、クリーニング器を包含している。感光体ドラム1は矢印の時計方向に所定の周速度にて回転駆動され、その周面に公知の電子写真プロセスにより目的の画像情報に対応したトナー画像が形成される。13は感光体ドラム12に対する像露光器としてのレーザー発信装置(スキャナ)であり、パーソナルコンピュータ(PC)等より入力伝達された画像情報の時系列電気デジタル画像信号に対応して強度変調されたレーザー光を出力して感光体ドラム12の帯電処理面を走査露光することで画像情報の静電潜像を形成する。

【0070】一方、給紙カセット14内に積載収容の記録紙(転写材)Pが給紙ローラ15の作動により一枚宛

給紙され、搬送ローラ16により搬送されて、感光体ドラム12と転写ローラ17の圧接ニップ部である転写部に所定の制御タイミングにて給送され、この給送記録紙P面に感光体ドラム12面側のトナー画像が順次に転写されていく。

【0071】転写部を通過した記録紙Pは定着装置18に導入される。定着装置18は例えば第1の実施例のフィルム加熱方式の加熱装置であり、前述のようにトナー画像が加熱定着される。

【0072】定着装置18を出た記録紙Pは定着排紙ローラ19・シートパス17を通過して排紙トレイ21にフェイスダウンで排出される。あるいは定着排紙ローラ19・シートパス22を通過してプリンタの後方にフェイスアップで排出される。

【0073】シートパス20・21におけるシートジャムはプリンタの後部ユニット23を二点鎖線示のように開いてプリンタ後部を開放することで処理される。24はプリンタのメインモータである。

【0074】

【発明の効果】以上説明したように本発明によれば、フィルム方式の加熱装置に用いられる加熱体として、その加熱体基材の板厚を薄くして熱容量を小さくした場合でも、強度低下させず、折れ・曲げに対して強く、折れ・曲げで通電発熱体パターンを断線させる恐れがなく、部品管理上取扱いやすいものとした加熱体を提供することができる。

【0075】また、上記の加熱体を備えて、耐久性に優れ、また加熱効率（定着効率）の高い加熱装置を提供す

ることができる。

【0076】さらに、上記の加熱装置を像加熱手段として具備した電子写真方式・静電記録方式等の画像形成装置を提供することができる。

【図面の簡単な説明】

【図1】 第1の実施例の加熱装置（定着装置）の要部の横断側面模型図

【図2】 同装置の要部の縦断正面模型図

【図3】 同装置の要部の一部切欠き斜視模型図

【図4】 その分解斜視模型図

【図5】 (a)は加熱体の表面側の一部切欠き平面模型図、(b)は加熱体の裏面側の平面模型図、(c)は(b)図のc-c線に沿う拡大横断面模型図

【図6】 加熱体の他の構成例の拡大横断面模型図

【図7】 第2の実施例の加熱体の拡大横断面模型図

【図8】 加熱体の他の構成例の拡大横断面模型図

【図9】 第3の実施例の加熱体の拡大横断面模型図

【図10】 加熱体の他の構成例の拡大横断面模型図

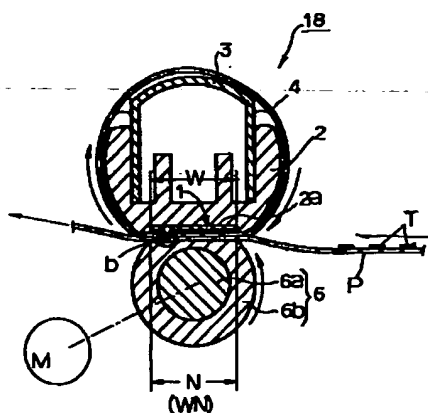
【図11】 (a)・(b)・(c)はそれぞれ第4の実施例の加熱体の拡大横断面模型図

【図12】 第3の実施例の画像形成装置の構成模型図

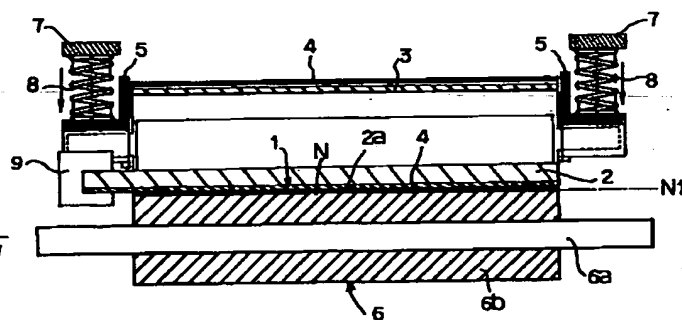
【符号の説明】

1・・・加熱体、2・・・フィルムガイド部材、3・・・補強ステー、4・・・円筒状フィルム（定着フィルム）、5・・・フィルム端部ガイド、6・・・加圧ローラ、N・・・ニップ、P・・・記録材、a・・・加熱体基材、b・・・凸部、c・・・絶縁層、d、e・・・通電発熱体ないしは給電路、f・・・第1の給電電極、g・・・第2の給電電極

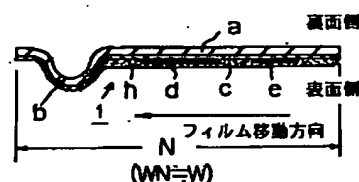
【図1】



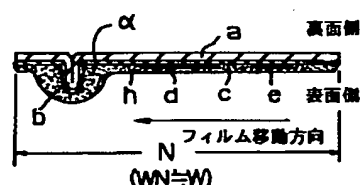
【図2】



【図6】

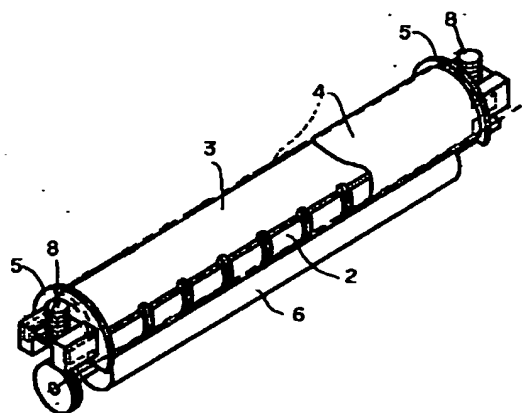


【図7】

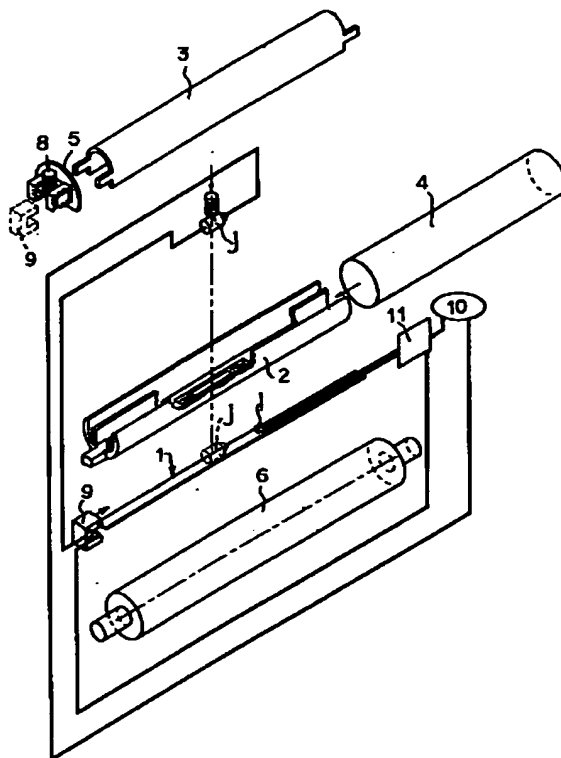




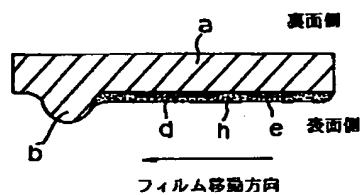
【図3】



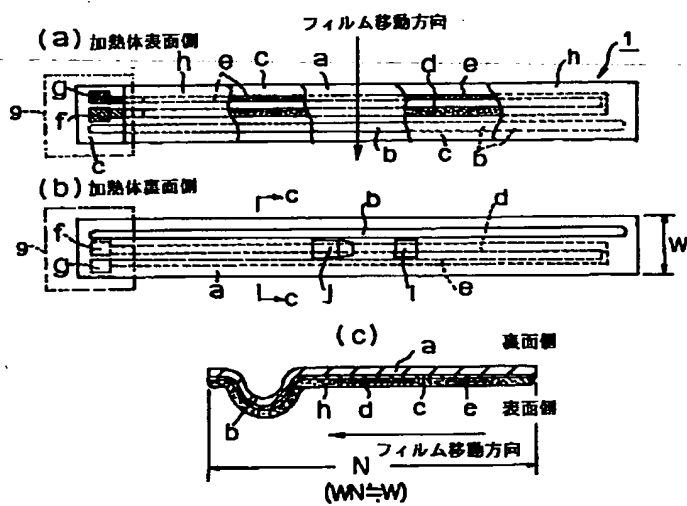
【図4】



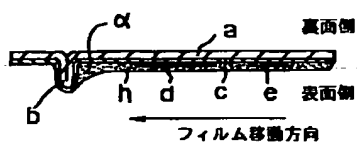
【図10】



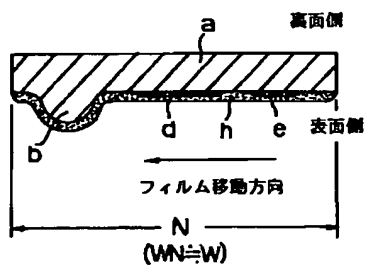
【図5】



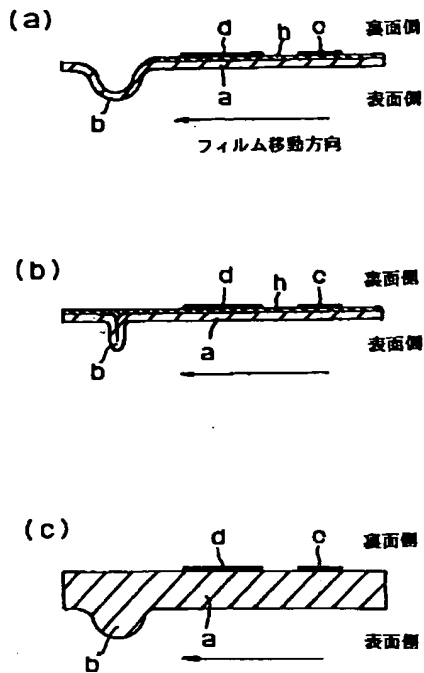
【図8】



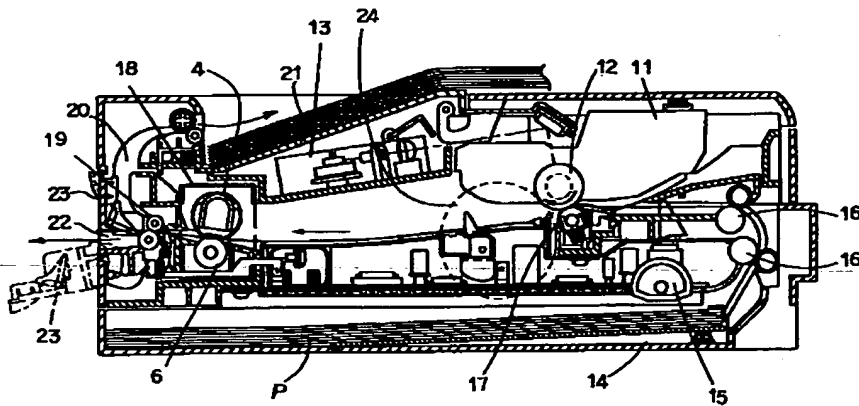
【図9】



【図11】



【図12】



フロントページの続き

Fターム(参考) 2H033 BA11 BA27 BE03  
 3K058 AA02 BA18 CE13 CE19 DA04  
 GA06  
 3K092 PP18 QA05 QB02 QB12 QB30  
 QB76 RF03 RF09 RF17 RF22  
 VV16 VV40

**\* NOTICES \***

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1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

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**CLAIMS**

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[Claim(s)]

[Claim 1] It is the heating object which heats the image of the record material by which fixed support is carried out, forms an application-of-pressure member and nip through a sliding film, and pinching conveyance is carried out between the film of said nip, and an application-of-pressure member through said film. A base material, It is the heating object characterized by having the heights which it has the heating element prepared in this base material, and said base material projects in the field of said nip at the film sliding-surface side, and have been prolonged in the film migration direction and the crossing direction.

[Claim 2] The heating object which it is a heating object according to claim 1, and said heights are outside the heating element field of said base material, and is characterized by being arranged at the record material \*\*\*\* direction downstream.

[Claim 3] The heating object which it is a heating object according to claim 1 or 2, and the construction material of said base material is a metal, and is characterized by forming said heating element in this base material through an insulating layer.

[Claim 4] The heating object which is a heating object given in which term of claims 1-3, and is characterized by forming said heights in the spinning or bending of this metal plate, using a metal plate as said base material.

[Claim 5] The heating object which it is a heating object according to claim 1 or 2, and the construction material of said base material is an insulating member, and is characterized by forming said heating element in this base material.

[Claim 6] The heating object which is a heating object given in which term of claims 1-5, and is characterized by forming said heating element of printing.

[Claim 7] The heating object by which fixed support was carried out, said heating object, the film which slides, and the application-of-pressure member which forms said heating object and nip through said film, In the heating apparatus which heats the image on record material with the heat from said heating object which \*\*\*\*(ed), was made to carry out pinching conveyance of the record material which supported the image between the film of said nip, and the application-of-pressure member, and minded said film It is the heating apparatus which said heating object has the heating element prepared in a base material and this base material, and is characterized by said base material having the heights prolonged in the direction which crosses with a projection and the film migration direction in the field of said nip at a film sliding-surface side.

[Claim 8] Heating apparatus which it is heating apparatus according to claim 7, and the heights of said heating object base material are outside the heating element field of said base material, and is characterized by being arranged at the record material \*\*\*\* direction downstream.

[Claim 9] Heating apparatus which it is heating apparatus according to claim 7 or 8, and the construction material of said heating object base material is a metal, and is characterized by forming said heating element in this base material through an insulating layer.

[Claim 10] Heating apparatus which is heating apparatus given in which term of claims 7-9, and is

characterized by forming said heights in the spinning or bending of this metal plate, using a metal plate as said heating object base material.

[Claim 11] Heating apparatus which it is heating apparatus according to claim 7 or 8, and the construction material of said heating object base material is an insulating member, and is characterized by forming said heating element in this base material.

[Claim 12] Heating apparatus which is heating apparatus given in which term of claims 7-11, and is characterized by forming said heating element of said heating object of printing.

[Claim 13] Heating apparatus characterized by being heating apparatus given in which term of claims 7-12, and said application-of-pressure member being body of revolution.

[Claim 14] Image formation equipment with which it is image formation equipment which has an imaging means to carry out formation support of the image, and an image heating means to heat the record material which supported the image, in record material, and said image heating means is characterized by being heating apparatus given in which term of claims 7-13.

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[Translation done.]

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**DETAILED DESCRIPTION**

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to image formation equipments (a copying machine, printer facsimile, etc.), such as an electrophotography method, electrostatic recording, a magnetic-recording method, etc. of the direct method or imprint method which possesses the heating object used for the heating apparatus of a film heating method, and this heating apparatus, and this heating apparatus as an image heating means.

[0002]

[Description of the Prior Art] The heating apparatus of a film heating method as indicated by JP,63-313182,A, JP,2-157872,A, etc. It has a heating object and the application-of-pressure member which forms nip through the heating object by which fixed support was carried out, a heating object, the film which slides, and a film. Between the film of nip, and an application-of-pressure member It is the thing of a configuration of heating the image on record material with the heat from the heating object which was made to carry out pinching conveyance of the record material (an electrofax sheet, an electrostatic recording sheet, an imprint material sheet, printing paper, etc.) which supported the image, and minded the film.

[0003] The quick thing of temperature up can be used with low heat capacities, such as a ceramic heater, as a heating object, the thing of a thin film with heat capacity small as a film can be used, and by heating only the nip which is a heating unit, quick-start nature (nature on demand) is good, and can realize image heating of energy saving.

[0004] A non-established toner image (toner image which consists of the resin of heating melting nature etc.) is utilizable for record material as an anchorage device which carries out heating fixation as a permanent fixing image, and also this heating apparatus is utilizable as the image heating apparatus which heats the record material which supported the image and reforms front-face nature, such as luster, assumption-arrival-processed image heating apparatus.

[0005]

[Problem(s) to be Solved by the Invention] In the heating apparatus of the above film methods, the ceramic heater as a heating object uses as a basic configuration member energization heating elements, such as ceramic substrates, such as an alumina as a heater base material, and silver-palladium (Ag/Pd) which carried out pattern formation to this ceramic radical plate surface and which it was made to possess with screen printing etc. By sheet-metal-izing the ceramic substrate as a heater base material, effectiveness is in the cutback of heat capacity, shortening of starting time amount, and the cutback of power consumption.

[0006] Moreover, the attempt replaced with a metal is accomplishing a heater base material from a ceramic. It is tried for the purpose of the manufacturing-cost cutback. To this substrate, through an insulating layer, pattern formation of the energization heating element is carried out, and, in the case of this metal substrate heater, it is prepared with screen printing etc. Compared with a ceramic, the handling on processing is advantageous, and also effectiveness is in the cutback of heat capacity,

shortening of starting time amount, and the cutback of power consumption by sheet-metal-izing the metal substrate as a heater base material to the board thickness below equivalent compared with the thickness of the conventional ceramic heater.

[0007] However, when also in the heater of a metal substrate board thickness of a substrate was made thin also in the heater of a ceramic substrate and it made heat capacity small, the reinforcement as a substrate or a heating object item decreased, and since the margin to a crease and bending and the margin [ as opposed to / become the reduction direction and / an open circuit of an energization heating element pattern the result ] decreased, it had the problem to which the handling on parts control becomes difficult.

[0008] Then, even when board thickness of a heater substrate (heating object base material) is made thin and heat capacity is made small as a heating object used for the heating apparatus of a film heating method, the object of this invention does not carry out on-the-strength lowering, is strong to a crease and bending, and is offering the heating object which there is no possibility may disconnect an energization heating element pattern in a crease and bending, and was made into the PD and the handling on parts control, or a cone thing.

[0009] Moreover, it is having the above-mentioned heating object, and excelling in endurance, and offering heating apparatus with high heating effectiveness (fixation effectiveness).

[0010] Furthermore, it is offering the image formation equipment which possesses the above-mentioned heating apparatus as an image heating means.

[0011]

[Means for Solving the Problem] This inventions are the heating object characterized by the following configuration, heating apparatus, and image formation equipment.

[0012] It is the heating object which heats the image of the record material by which fixed support is carried out, forms an application-of-pressure member and nip through a sliding film, and pinching conveyance is carried out between the film of said nip, and an application-of-pressure member through said film. (1) A base material, It is the heating object characterized by having the heights which it has the heating element prepared in this base material, and said base material projects in the field of said nip at the film sliding-surface side, and have been prolonged in the film migration direction and the crossing direction.

[0013] (2) The heating object which it is a heating object given in the above (1), and said heights are outside the heating element field of said base material, and is characterized by being arranged at the record material \*\*\*\* direction downstream.

[0014] (3) The heating object which it is a heating object the above (1) or given in (2), and the construction material of said base material is a metal, and is characterized by forming said heating element in this base material through an insulating layer.

[0015] (4) The heating object which is a heating object given in any of (3) they are from the above (1), and is characterized by forming said heights in the spinning or bending of this metal plate, using a metal plate as said base material.

[0016] (5) The heating object which it is a heating object the above (1) or given in (2), and the construction material of said base material is an insulating member, and is characterized by forming said heating element in this base material.

[0017] (6) The heating object which is a heating object given in any of (5) they are from the above (1), and is characterized by forming said heating element of printing.

[0018] (7) The heating object by which fixed support was carried out, said heating object, and the film which slides, It has the application-of-pressure member which forms said heating object and nip through said film. In the heating apparatus which heats the image on record material with the heat from said heating object which was made to carry out pinching conveyance of the record material which supported the image between the film of said nip, and the application-of-pressure member, and minded said film It is the heating apparatus which said heating object has the heating element prepared in a base material and this base material, and is characterized by said base material having the heights prolonged in the direction which crosses with a projection and the film migration direction in the field of said nip at a

film sliding-surface side.

[0019] (8) Heating apparatus which it is heating apparatus given in the above (7), and the heights of said heating object base material are outside the heating element field of said base material, and is characterized by being arranged at the record material \*\*\*\* direction downstream.

[0020] (9) Heating apparatus which it is heating apparatus the above (7) or given in (8), and the construction material of said heating object base material is a metal, and is characterized by forming said heating element in this base material through an insulating layer.

[0021] (10) Heating apparatus which is heating apparatus given in any of (9) they are from the above (7), and is characterized by forming said heights in the spinning or bending of this metal plate, using a metal plate as said heating object base material.

[0022] (11) Heating apparatus which it is heating apparatus the above (7) or given in (8), and the construction material of said heating object base material is an insulating member, and is characterized by forming said heating element in this base material.

[0023] (12) Heating apparatus which is heating apparatus given in any of (11) they are from the above (7), and is characterized by forming said heating element of said heating object of printing.

[0024] (13) Heating apparatus characterized by being heating apparatus given in any of (12) they are from the above (7), and said application-of-pressure member being body of revolution.

[0025] (14) Image formation equipment characterized by being image formation equipment which has an imaging means to carry out formation support of the image, and an image heating means to heat the record material which supported the image, in record material, and said image heating means being heating apparatus given in any of (7) to (13) they are.

[0026] (Work for )

\*\* . a heating object by having the heights to which the ridgeline has extended in the direction which intersects a part of the base material with the film migration direction Even when board thickness of a base material is made thin for the heights' reduction of an operation of a reinforcing rib of nothing and heat capacity, rigidity is maintained, on-the-strength lowering is not carried out, to a crease and bending, it is strong, there is no possibility of disconnecting an energization heating element pattern in a crease and bending, and it becomes the PD and the handling on parts control, and a cone thing.

[0027] \*\* . It is having made the heights project to a film sliding-surface side, and having prepared them in the field of nip, again. Without missing excessive heat to a heating object rear-face side (a nip side being an opposite hand) And since it becomes what is strongly done to record material by the above-mentioned heights for the pressure welding of the image (toner) which carried out melting softening with heating in nip with a melting condition (momentary high voltage is applied to the toner fused on record material), fixation effectiveness improves.

[0028]

[Embodiment of the Invention] (The 1st example) drawing 1 -- crossing side-face model drawing of the important section of the heating apparatus of this example, and drawing 2 -- vertical section transverse-plane model drawing of the important section of this equipment, and drawing 3 -- a part of important section of this equipment -- notch strabism model drawing and drawing 4 are the decomposition strabism model drawing.

[0029] The heating apparatus 18 of this example is an anchorage device of the film heating method of the tension loess type which used the cylindrical film (endless film) of disclosure for the JP,4-44075,A - No. 44083 official report, this 4 No. -204980-204984 official report, etc.

[0030] 1 is the heating object (heating means) of long and slender low sheet metal-like heat capacity. The structure of this heating object is mentioned later. 2 is the \*\* type film guide member of a crossing appearance abbreviation semicircle arc formed with the heat insulator. The above-mentioned heating object 1 is inserted in heating object hold crevice 2a made to provide along with member straight side, and is attached in the abbreviation center section of the underside of this film guide member 2. 3 is the reinforcement stay of a cross-section facing-down the mold of U characters, and is inserted in inside the above-mentioned film guide member 2. 4 is a heat-resistant cylinder-like film (fixation film). The inner circumference length of this film 4 is lengthened about 3mm, for example rather than the periphery

length of the assembly object of the above-mentioned heating object 1, film guide member 2, and reinforcement stay 3, and makes this film 4 have attached outside loosely to above-mentioned assembly object 1-2-3. 5-5 is the film edge guide (flange material) with which the both ends of the reinforcement stay 3 were equipped, respectively. Let the above assembly objects 1-5 be heating assemblies (heating means).

[0031] 6 is an elastic application-of-pressure roller as application-of-pressure body of revolution. It becomes rodding 6a and this rodding from good rubber elastic layer 6b of mold-releases characteristic, such as silicone rubber prepared in this cardiac one, and revolution freedom is made to have supported the both ends of rodding 6a through bearing between the chassis side plates the near side which is not illustrated [ of equipment ], and by the side of the back, respectively.

[0032] The heating object 1 side places for the above-mentioned heating assemblies 1-5 to this application-of-pressure roller 6 up side upside down, and make a way lobe engage with the lengthwise direction guide slit section of the chassis side plate the near side which is not illustrated [ of equipment ], and by the side of the back, respectively outside the film edge guide 5-5 by the side of ends, drop between the chassis side plates a near side and by the side of the back, make a film 4 insert into the top face of the application-of-pressure roller 6, and the opposite location of the downward field of the heating object 1 carries out.

[0033] And outside each film edge guide 5-5 by the side of ends, a film 4 is made to insert the heating object 1 by \*\*\*\*(ing) the application-of-pressure spring 8-8, respectively between a way lobe and the immovable spring receptacle section 7-7 of an upper part [ it ] location, the elasticity of rubber elastic layer 6b is resisted to the application-of-pressure roller 6, and the pressure welding has been carried out by about 39-196 Ns (4-20kgf) of total pressure. Thereby, the nip (fixation nip section) N of predetermined width of face is formed on both sides of a film 4 between the heating object 1 and the application-of-pressure roller 6. the nip N -- the longitudinal direction whole region of the application-of-pressure roller 6 or the heating object 1 -- rear-spring-supporter abbreviation -- it has uniform width of face. That is, the reinforcement stay 3 is pressurized from right above through the film edge guide 5-5 of the both ends, and it is considered that a deflection does not arise throughout nip. A nip line does not bend but turns into the straight line N1 ( drawing 2 ) without ideal bending. At this time, the nip width of face WN becomes equal, and toner fixable is guaranteed to homogeneity in the paper width direction.

[0034] In order that a film 4 may make heat capacity small and may raise quick-start nature Monolayer films which the thickness of a film has [ endurance / of 50 micrometers or less 30 micrometers or more / the thermal resistance, the mold-release characteristic, reinforcement, the endurance, etc. ] preferably the total thickness of 100 micrometers or less, such as PTFE and PFA, Or a metallic conduit those with a seam using the compound layer film which coated the front face of films, such as polyimide, polyamidoimide, PEEK, and PES, PPS, with PTFE, PFA, FEP, etc. as a mold release layer, or a metallic foil, or seamless is also included.

[0035] In drawing 1 , revolution actuation of the application-of-pressure roller 6 is carried out by the driving means M with a predetermined peripheral velocity at the counterclockwise rotation of an arrow head. Turning effort acts on the cylinder-like film 4 by the pressure-welding frictional force in the nip N of the outside surface of this roller by revolution of this application-of-pressure roller 6, and the outside surface of a film 4. This film 4 will be in a revolution condition to the revolution peripheral velocity of the application-of-pressure roller 6 about an area around of the film guide member 2 and the reinforcement stay 3 with the peripheral velocity of an arrow head which carried out the abbreviation response clockwise, while the inner surface sticks to the downward field of the heating object 1 and slides in Nip N (application-of-pressure roller actuation method).

[0036] A revolution of the above-mentioned film 4 can be made smoother by making lubricant, such as grease, intervene between the outside surface of the film guide member 2, and the inner surface of a film 4. The approach migration in alignment with the straight side of the film guide member 2 accompanying a revolution of a film 4 is regulated by the edge of a film 4 being caught by the inner surface of a guide 5.

[0037] In the condition that revolution actuation of the application-of-pressure roller 6 was carried out,



the cylindrical film 4 changed into the revolution condition in connection with it, energization was made by the heating object 1, and temperature control of the nip N was started and carried out to predetermined temperature by generation of heat of this heating object 1 so that it might mention later. The recording paper P which supported the non-established toner image T is introduced between the film 4 of Nip N, and the application-of-pressure roller 6, in Nip N, the toner image support side side of the recording paper P sticks to the outside surface of a film 4, and pinching conveyance is carried out in Nip N together with the film 4. In this pinching conveyance process, the heat of the heating object 1 is given to the recording paper P through a film 4, and heating melting fixation of the non-established toner image T in the record paper is carried out. From the outside surface of the film 4 which will rotate if Nip N is passed, the recording paper P carries out curvature separation, and is conveyed.

[0038] The structure of the heating object 1 is explained below. The heating object 1 in this example is the thing of a type which used the metal plate for the heating object base material. The metallic materials to be used are the iron system metal represented by the stainless steel, aluminum, a copper alloy, etc.

[0039] (a) of drawing 5 is amplification cross-section model drawing by the side of the front face of a heating object where notch flat-surface model drawing and (b) meet flat-surface model drawing by the side of the rear face of a heating object, and (c) meets the c-c line of (b) drawing in part.

[0040] a is a metal plate base material which makes straight side the film migration direction (the recording paper \*\*\*\* direction) and the direction which carries out an abbreviation rectangular cross. W is the width of face of this metal plate base material a, and has the relation of  $WN \ll W$  to the aforementioned nip width of face WN. b is a bead (beading) by the metal plate spinning as heights made to provide along with the straight side of this metal plate base material a. This bead b is made to project to the front-face, i.e., film sliding surface, side (recording paper side) of the heating object 1, and is made to provide. The amount of projection is 1mm or less.

[0041] The insulating layer which c made cover the front-face side of the metal plate base material b, and d are the energization heating elements (resistance heating element) as a linear or thin band-like source of generation of heat made to provide along with base material straight side on this insulating layer c.

[0042] e is the linear or thin band-like feed line which the energization heating element d was made to possess in parallel along with base material straight side on an insulating layer c similarly.

[0043] f and g are the 1st and 2nd feed electrode installed on the insulating layer c at the end section side of base material straight side, and the end section and the electric target of the above-mentioned energization heating element d are made to have flowed through the 1st feed electrode f. The end section and the electric target of the above-mentioned feed line e are made to have flowed through the 2nd feed electrode g. Moreover, it is made to have flowed through the energization heating element d and the other end of a feed line e electrically mutually.

[0044] h is electric insulation overcoat layers, such as glass as a surface protective layer which made the heating body surface cover extensively except for the part of 1st and 2nd feed electrode f-g.

[0045] It is the thermal fuse and thermo switch as temperature sensing elements, such as a thermistor which i was contacted to the rear-face (tooth back) side of the heating object 1, and was prepared, and a temperature sensing element for safety practices (cure against overrun temperature up by failure of a thermal protector and equipment etc.) which j was similarly contacted to the rear-face side of the heating object 1, and was prepared.

[0046] The energization heating element d is formed by carrying out coating of the electric resistance ingredient pastes (resistive paste), such as for example, silver-palladium (Ag/Pd) and Ta<sub>2</sub>N, to a thin band-like pattern with 10 micrometers [ in thickness ], and a width of face of 1-3mm by screen-stencil etc., and calcinating them.

[0047] It is formed because feed line e, 1st, and 2nd feed electrode f-g also carries out coating of the silver (Ag) paste to a necessary pattern by screen-stencil etc. and calcinates it.

[0048] The overcoat layer h side of the heating object 1 is a front-face side on which a film slides. The heating object 1 makes this front-face side expose outside, is inserted in heating object hold crevice 2a made to provide along with member straight side, and is attached in the abbreviation center section of

the underside of the film guide member 2.

[0049] 9 is a connector for feed to the energization heating element d of the heating object 1, and is attached in the edge by the side of the heating object feed electrode of the film guide member 2 which attached the heating object 1. Although the connector 9 is considered as the arrangement inserted in parallel to a heating length hand, after taking about 1st and 2nd feed electrode f-g, it is good also as vertical arrangement to a longitudinal direction.

[0050] An electrical potential difference is impressed from AC power supply 10 ( drawing 4 ) between the 1st [ of the heating object 1 ], and 2nd feed electrode f.g through this connector 9 for feed, and the heating object 1 carries out temperature up because the energization heating element d generates heat. Temperature control of the temperature of the heating object 1 is carried out so that the temperature of the heating object 1 which is detected by the temperature sensing element i of the tooth back of the heating object base material a, and is detected by the temperature sensing element i at the time of fixation activation by the detection information being fed back to the energization control circuit 11, and the energization to the energization heating element d being controlled from AC power supply may turn into predetermined temperature (fixation temperature).

[0051] The thermal fuse or the thermo switch j is inserted in the serial in the feeder circuit to the energization heating element d, operates at the time of the fault temperature up besides allowance of the heating object 1, and carries out the emergency trip of the feed to the energization heating element d.

[0052] The heating object 1 of this example offers the curvature guarantee of the energization heating element d in an item condition on the strength by having formed the thinning of a said division article, and the bead b as heights, using a metal as a heating object base material a, and having allotted so that it might project to recording paper \*\*\*\*\*, it is the longitudinal whole region, and it realizes an improvement and the cutback of power consumption for fixation effectiveness, preventing an open circuit of the energization heating element d by a crease and bending. That is, on-the-strength lowering is not carried out because reinforcement by Bead b has accomplished, and even when the board thickness is made thin and heat capacity is made small, using a metal as a heating object base material a, to a crease and bending, it is strong, and there is no possibility of disconnecting an energization heating element pattern in a crease and bending, and it is made with the handling on parts control, and a cone thing.

[0053] The heating object base material a has the bead b as heights prolonged in the detail-paper \*\*\*\* direction and the crossing direction from the energization heating element d in the detail-paper \*\*\*\* direction at the downstream in the nip width of face WN, slides without carrying out to a film 4 per edge, and is carrying out the pressure welding of the fused toner to the detail paper through the film 4. That is, the record material P which passed through the location of the energization heating element d in Nip N carries the fused toner, and reaches the bead b in Nip N, a pressure welding is momentarily carried out strongly to the recording paper, and its fixation effectiveness improves. At this time, the inner skin and Bead b of a film 4 can rub by providing the curved-surface section in the bead point so that it may not carry out per edge, and applying lubricant to film inner skin, without receiving a damage in film inner skin.

[0054] The overcoat layer h of the heating object 1 may make only the energization heating element d and the surface part of a feed line e cover like the example of drawing 6 , and may be made to provide, and the same effectiveness is acquired.

[0055] At the time of components mass production, at press-working-of-sheet-metal 1 process, the bead b as heights which the metal substrate a which is a heating object base material is made to possess can carry out the pressure welding of the toner which can make two or more base materials easy to process it simultaneously, and is in a melting condition to the detail paper, and can avoid per [ with a film ] edge.

[0056] (The 2nd example) Drawing 7 is cross-section amplification model drawing of the heating object 1 of this example. The heating object 1 of this example forms the heights b which the metal plate base material a is made to possess by hemming bending (bending of a metal plate). Since other heating object configurations are the same as that of the heating object in the 1st example mentioned above, explanation for the second time is omitted.

[0057] It is made easy also in this example, for the heating object base material a to be a metal plate, and for reinforcement by thinning and hemming bending to have accomplished, and to be in an item condition, to be hard to disconnect the energization heating element d to a crease and bending, and to treat.

[0058] The record material P which passed through the location of the energization heating element d in Nip N carries the fused toner, and reaches the bead b as heights in Nip N, a pressure welding is momentarily carried out strongly to the recording paper, and its fixation effectiveness improves. At this time, the inner skin of a film 4 and the hemming bending section b are not carried out per edge by burying the minute level difference section alpha by the glass coat layer as an overcoat layer h. Moreover, it can rub by using lubricant, without receiving a damage in film inner skin.

[0059] The overcoat layer h of the heating object 1 may make only the energization heating element d and the surface part of a feed line e cover like the example of drawing 8, and may be made to provide, and the same effectiveness is acquired.

[0060] (The 3rd example) Drawing 9 is cross-section amplification model drawing of the heating object 1 of this example. The heating object 1 of this example makes all the longitudinal direction fields of a base material a possess the heights b, in order to carry out the pressure welding of the toner [ having fused within Nip N ] to the recording paper strongly momentarily, using heat insulators, such as a ceramic, as a heating object base material a. The heights head ridgeline projects in Nip N. The insulating layer c is unnecessary. Since other heating object configurations are the same as that of the heating object in the 1st example mentioned above, explanation for the second time is omitted.

[0061] It is made easy for reinforcement by thinning and Heights b to have accomplished also in this example, to be hard to disconnect the energization heating element d in the state of an item to a crease and bending, and to treat.

[0062] The record material P which passed through the location of the energization heating element d in Nip N carries the fused toner, and reaches the heights b in Nip N, a pressure welding is momentarily carried out strongly to the recording paper, and its fixation effectiveness improves. At this time, the inner skin and Heights b of a film 4 can rub by not having the edge section in the said division, and using lubricant, without receiving a damage in film inner skin.

[0063] The overcoat layer h of the heating object 1 may make only the energization heating element d and the surface part of a feed line e cover like the example of drawing 10, and may be made to provide, and the same effectiveness is acquired.

[0064] (The 4th example)

1) It can also be made the thing of structure (rear-face heating mold) which made the rear-face side of the metal plate base material a of the heating object 1 possess the energization heating element d, a feed line e, and feed electrode f-g through an insulating layer c about the heating object of the 1st above-mentioned example and the 2nd example as shown in (a) of drawing 11, and (b).

[0065] 2) It can also be made the thing of structure which made the energization heating element d, a feed line e, and feed electrode f-g provide in the rear-face side also about the heating object of the 3rd above-mentioned example using ceramics of high temperature conductivity like for example, aluminium nitride (AlN) and silicon carbide (SiC) as a heating object base material a as shown in (c) of drawing 11.

[0066] 3) As for the pattern configuration of the energization heating element d, a feed line e, and feed electrode f.g grade, and a heating apparatus configuration, it is needless to say that it is not restricted to the thing of an example.

[0067] 4) Of course, the arrangement location of the temperature detector element i for temperature control and the temperature sensing element j for safety practices etc. is not restricted to the thing of an example. For example, the temperature detector element i for temperature control is the outside of a \*\*\*\* field, and near the \*\*\*\* heating element, and may be arranged to the nearest to an outside of a film. When the film was a metal cylinder, after performing a required insulation, you may arrange to inner skin.

[0068] (The 5th example) Drawing 12 is the outline block diagram of an example of image formation

equipment which made the heating apparatus (anchorage device) 18 of the 1st example provide. The image formation equipment of this example is the laser beam printer which used the imprint method electrophotography process.

[0069] To the body of a printer, 11 is the process cartridge which can be detached and attached freely, and includes the photo conductor drum 12, the non-illustrated electrification machine, the development counter, and the cleaning machine. Revolution actuation of the photoconductor drum 1 is clockwise carried out with a predetermined peripheral velocity of an arrow head, and the toner image corresponding to the target image information is formed in the peripheral surface of a well-known electrophotography process. 13 is a laser sender (scanner) as an image photographic filter to the photo conductor drum 12, and the electrostatic latent image of image information is formed by outputting the laser light by which intensity modulation was carried out corresponding to the time series electrical-and-electric-equipment digital pixel signal of the image information by which input transfer was carried out from the personal computer (PC) etc., and carrying out scan exposure of the electrification processing side of a photoconductor drum 12.

[0070] On the other hand, paper is addressing[ to one sheet ]-fed to the recording paper (imprint material) P of loading hold in a sheet paper cassette 14 by actuation of the feed roller 15, it is conveyed with the conveyance roller 16, the imprint section which is the pressure-welding nip section of the photo conductor drum 12 and the imprint roller 17 is fed to predetermined control timing, and the toner image by the side of the 12th page of a photo conductor drum is imprinted one by one by the Pth page of this feed recording paper.

[0071] The recording paper P which passed the imprint section is introduced into an anchorage device 18. An anchorage device 18 is the heating apparatus of the film heating method of the 1st example, and heating fixation of the toner image is carried out as mentioned above.

[0072] The recording paper P which came out of the anchorage device 18 is discharged by the paper output tray 21 by face down through fixation delivery roller 19 and the sheet pass 17. Or it is discharged by face up behind a printer through fixation delivery roller 19 and the sheet pass 22.

[0073] The sheet jam in the sheet pass 20-21 is processed by opening the back unit 23 of a printer like \*\*\*\*\* , and opening the printer back. 24 is the main motor capacity of a printer.

[0074]

[Effect of the Invention] On-the-strength lowering cannot be carried out, as explained above, even when according to this invention board thickness of the heating object base material is made thin and heat capacity is made small as a heating object used for the heating apparatus of a film method, to a crease and bending, it is strong, and there is no possibility of disconnecting an energization heating element pattern in a crease and bending, and the heating object made into the handling on parts control or a cone thing can be offered.

[0075] Moreover, it has the above-mentioned heating object, and excels in endurance, and heating apparatus with high heating effectiveness (fixation effectiveness) can be offered.

[0076] Furthermore, image formation equipments, such as an electrophotography method, electrostatic recording, etc. which possesses the above-mentioned heating apparatus as an image heating means, can be offered.

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[Translation done.]